

NEVADA TEST SITE DEFENSE WASTE ACCEPTANCE CRITERIA, CERTIFICATION, AND TRANSFER REQUIREMENTS



OCTOBER 1988

PREPARED JOINTLY BY
THE U.S. DEPARTMENT OF ENERGY NEVADA OPERATIONS OFFICE
AND
REYNOLDS ELECTRICAL & ENGINEERING CO., INC.

ADMIN RECORD

A-SW-001237

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately-owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof.

Printed in the United States of America
Available from
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

NTIS price codes
Printed copy: A04
Microfiche copy: A01

Codes are used for pricing all publications. The code is determined by the number of pages in the publication. Information pertaining to the pricing codes may be found in the current issues of the following publications, which are generally available in most libraries: Energy Research Abstracts (ERA); Government Reports Announcement and Index (GRA and I); Scientific and Technical Abstract Reports (STAR); and publication NTIS-PR-360 available from NTIS at the above address.

NEVADA TEST SITE
DEFENSE WASTE ACCEPTANCE CRITERIA,
CERTIFICATION, AND TRANSFER REQUIREMENTS

October 1988

Prepared jointly by

U.S. Department of Energy
Nevada Operations Office

and

Reynolds Electrical & Engineering Co., Inc.
Defense Waste Management Department

ABSTRACT

The Nevada Test Site (NTS) Defense Waste Acceptance Criteria, Certification, and Transfer Requirements establishes procedures and criteria for safe transfer, disposal, and storage of defense transuranic, low-level, and mixed waste at the NTS. Included are an overview of the NTS defense waste management program; the NTS waste acceptance criteria for transuranic, low-level, and mixed wastes; waste certification requirements and guidance; application to submit waste; and requirements for waste transfer and receipt.

CONTENTS

	<u>PAGE</u>
List of Figures	i
List of Acronyms	ii
<u>SECTION</u>	
1 DEFENSE WASTE MANAGEMENT AT THE NEVADA TEST SITE	1
1.1 Purpose and Scope	1
1.2 Policy	1
1.3 Responsibility	2
1.4 Exemptions	2
1.5 Forecasting	3
1.6 Funding	3
1.7 Implementation Plan	3
2 DEFENSE WASTE ACCEPTANCE CRITERIA	5
2.1 Waste Package Criteria	5
2.1.1 General Regulatory Criteria	5
2.1.2 NTS Specific Package Criteria	7
2.2 Waste Form Criteria	8
2.2.1 General Waste Form Criteria	8
2.2.2 Additional Criteria for Mixed Waste	10
3 WASTE CHARACTERIZATION AND CERTIFICATION	12
3.1 Waste Characterization	12
3.1.1 Waste Sampling and Analysis	12
3.1.2 Characterizing By Process Knowledge	12
3.1.3 Waste Stream Characterization Data	13
3.2 Waste Certification	15
3.2.1 Certification Program	15
3.2.2 Certification Officials, Statements, and Labels	15
4 GENERATOR APPLICATION AND APPROVAL	17
4.1 Generator Application to Ship Waste	17
4.2 Generator Approval Process	19
4.3 Generator Recertification	19
5 WASTE TRANSFER	22
5.1 Shipping Arrangements	22
5.2 Waste Receipt	24
5.3 Waste Records	24

CONTENTS (Concluded)

APPENDIX

A	Selected Glossary	25
B	Instructions for the Waste Stream Characterization Data Sheet	28
C	Generator Waste Certification Program Plan Guidance	30

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
1	Example of Three-Year Waste Shipment Forecast	4
2	Example of Waste Stream Characterization Data Sheet	14
3	Example of NV-211 Form	16
4	Outline of Generator Application to Ship Waste	18
5	Waste Generator Approval Process	20

LIST OF ACRONYMS

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy/Nevada Operations Office
DOT	U.S. Department of Transportation
DWMD	Defense Waste Management Department (REECo)
EPA	U.S. Environmental Protection Agency
LLW	Low-Level Waste
MW	Mixed Waste
NTS	Nevada Test Site
RCRA	Resource Conservation and Recovery Act
REECo	Reynolds Electrical & Engineering Co., Inc.
RWMS	Radioactive Waste Management Site
TRU	Transuranic
WAC	Waste Acceptance Criteria
WIPP	Waste Isolation Pilot Plant

SECTION 1

DEFENSE WASTE MANAGEMENT AT THE NEVADA TEST SITE

1.1 Purpose and Scope

This document establishes U.S. Department of Energy Nevada Operations Office (DOE/NV) defense radioactive waste acceptance criteria and requirements for waste certification and transfer. These criteria and requirements apply to all waste received at the Nevada Test Site (NTS) Area 3 and Area 5 Radioactive Waste Management Sites (RWMS) for storage or disposal. The generator approval process also is outlined. (A selected glossary of pertinent terminology is provided as Appendix A.)

The requirements in this document apply to both onsite and offsite waste generators and replace the requirements of NVO-185, Rev. 4, Operational Radioactive Defense Waste Management Plan for the Nevada Test Site dated January 1985. (NVO-185) will continue to exist as a DOE/NV defense low-level waste management program planning document.)

1.2 Policy

The policy of DOE/NV is to receive, store, and dispose of radioactive wastes generated by DOE defense programs in a manner consistent with DOE Order 5820.2A, "Radioactive Waste Management," and on a noninterference basis with DOE/NV prime program missions. This policy is designed to ensure that present and future radiation exposures are kept as low as reasonably achievable (ALARA) and do not exceed the radiation protection standards established in DOE Order 5480.11, "Requirements for Radiation Protection," and NVO-232, Radiation Safety Manual for the Nevada Test Site. This policy also is designed to protect the environment from any chemical hazards in the waste in accordance with the Resource Conservation and Recovery Act (RCRA) and amendments.

The Area 3 RWMS and the Area 5 RWMS are the only two NTS locations approved by DOE/NV for disposal of defense low-level waste. The following waste types are accepted at these NTS waste management sites.

Low-Level Waste (LLW): All radioactive waste not classified as high-level waste, spent nuclear fuel, transuranic waste, uranium mill tailings, or mixed waste. LLW is accepted for disposal only. Packaged LLW is disposed at the Area 5 RWMS; bulk LLW is disposed at the Area 3 RWMS.

Mixed Waste (MW): LLW containing both radioactive and hazardous components as defined by the Atomic Energy Act and RCRA, respectively. MW is accepted for disposal only at the Area 5 RWMS.

Transuranic (TRU) Waste: Radioactive waste containing alpha-emitting radionuclides having atomic numbers greater than 92 and half-lives greater than 20 years in concentrations greater than 100 nCi/g at the time of assay. TRU waste is accepted at the Area 5 RWMS only for interim storage pending reshipment to the Waste Isolation Pilot Plant (WIPP).

Defense waste that is classified for security reasons is accepted only at the Area 5 RWMS and only with prior written approval from DOE/NV.

Waste will be accepted only from generators approved by DOE/NV, with all generators and packages reviewed for compliance with the requirements of this document and additional requirements as may be established by DOE/NV. Nonradioactive hazardous waste will not be accepted for disposal or storage at NTS from onsite or offsite generators. Radioactive material generated at, or obtained from, NTS may be returned to NTS for disposal subject to the requirements of this document.

1.3 Responsibility

- A. The DOE/NV Manager has those responsibilities and authorities as assigned in DOE Order 5820.2A. He provides authority to waste generators to dispose of defense low-level waste at the NTS and grants any exemptions to the requirements of this document. The Director of the Health Physics and Defense Waste Division has been delegated authority for DOE/NV defense waste management. The Director of the Safeguards and Security Division has been delegated authority to grant approval for acceptance of classified waste.
- B. Reynolds Electrical and Engineering Co., Inc. (REECo), as the NTS waste management contractor, is responsible for the safe management of defense waste at the NTS. The REECo Defense Waste Management Department (DWMD) conducts NTS defense waste management activities, which include operation, maintenance, and environmental surveillance of the Area 3 RWMS and the Area 5 RWMS.

1.4 Exemptions

The DOE/NV Manager may approve exemptions to the criteria specified in this document. All requests must be submitted to DOE/NV in writing and a copy of the exemption request shall also be sent to REECo DWMD. ~~A safety analysis is required for any exemptions.~~ All significant exemptions to the criteria specified in this document must be approved by the DOE/NV Manager prior to shipment. See Section 4.1 of this document to obtain more information on applying for exemptions to NVO-325 criteria; also contact DOE/NV (Commercial: 702-295-3181; FTS: 575-3181).

1.5 Forecasting

For each waste stream forecast of estimated waste volume, waste type, number and type of packages, and number of shipments shall be provided to DOE/NV and REECo DWMD to aid in planning for future waste shipments. Forecasts shall be prepared for a three-fiscal-year period with the first fiscal year divided into four three-month increments; that is, October through December, January through March, April through June, and July through September (see Figure 1). Forecasts shall be updated every six months and are due by September 15 and March 15. REECo DWMD personnel use these forecasts to project manpower, equipment, storage area, and disposal area requirements. Failure to provide these forecasts promptly may delay acceptance of waste shipments.

1.6 Funding

Disposal operations at the NTS are incrementally financed by approved waste generators prepaying their estimated waste volumes by at least a fiscal quarter in advance. The generator should prepare purchase orders, addressed to REECo, based upon a minimum of two quarters estimated waste volume and consistent with the forecasts identified above and the prevalent disposal charge per cubic foot. Separate purchase orders should be provided for each waste type, that is, TRU waste, LLW, and MW. Upon receipt of the purchase orders, REECo will bill the projected amount for the first succeeding quarter. Prompt payment thereof will be expected. One month before the beginning of each succeeding quarter, REECo will bill against the generator's forecasted volumes and associated purchase orders. Adjustments of any amount paid, based on variances between actual and forecasted volumes, are not contemplated unless there is a significant variance, either over or under, between actual costs incurred and the payment. Generators may adjust any quarterly forecast prior to the initiation of billing by REECo for that quarter.

1.7 Implementation Plan

The waste acceptance criteria, characterization, and certification requirements detailed in this document are effective immediately. All waste generators, both on- and offsite, shall submit to DOE/NV and REECo DWMD a schedule for complying with the requirements within 90 days of issuance of this document. Between revisions, DOE/NV will advise all generators, in writing, of any additional requirements for waste acceptance at NTS waste management sites.

3-YEAR WASTE SHIPMENT FORECAST

GENERATOR

PREPARED BY

DATE

FORECAST PERIOD	WASTE STREAM NUMBER	WASTE TYPE	CONTAINER			NO. OF SHIPMENTS	TOTAL VOLUME
			TYPE	SIZE	#		
FY 19							
10/01-12/31							
1/01 - 3/31							
4/01 - 6/30							
7/1 - 9/30							
FY 19							
FY 19							

REMARKS

Figure 1. Example of Three-Year Waste Shipment Forecast

SECTION 2

DEFENSE WASTE ACCEPTANCE CRITERIA

The following NTS waste acceptance criteria (WAC) have been established to assure that U.S. Department of Transportation (DOT) and U. S. Environmental Protection Agency (EPA) requirements are met and to satisfy operational concerns at NTS waste management sites. Complying with these WAC will allow proper disposition of defense TRU waste, LLW, and MW at NTS waste management sites. Clarifications of the WAC and assistance on compliance requirements can be obtained from the DOE/NV Defense Waste Branch (Commercial: 702-295-3181; FTS: 575-3181) or from REECO DWMD (Commercial: 702-295-6406; FTS: 575-6406).

Any TRU waste designated for NTS interim retrievable storage is considered newly-generated and must be certified by the generator as being in compliance with the WIPP WAC. That is, waste must meet all documentation, waste form, and packaging requirements of the WIPP WAC. (See WIPP-DOE-069, as updated.) TRU mixed waste is not accepted at NTS for interim storage.

Requests for storage of classified TRU waste that meets the waste package criteria in Section 2.1 and the general waste form criteria in Section 2.2.1, items B through H, will be considered on a case-by-case basis. Other classified waste must meet all the requirements of this document unless specific exemptions have been granted by the DOE/NV Manager.

2.1 Waste Package Criteria

The NTS waste package criteria include regulatory criteria to meet DOT and EPA requirements and criteria established to meet specific requirements at NTS waste management sites.

2.1.1 General Regulatory Criteria

Defense waste shipped to NTS waste management sites for storage or disposal must be packaged in accordance with all DOT regulations. At a minimum, the following criteria shall be met for both onsite and offsite waste.

- A. Design. Type A packaging shall be designed to meet Title 49 Code of Federal Regulations (CFR) 173.411, "General Design Requirements," and Title 49 CFR 173.412, "Additional Design Requirements for Type A Packages." Type B packaging must meet the applicable requirements of Title 10 CFR 71. Strong, tight packaging used for shipping limited quantities of LLW and low specific activity waste excepted by Title 49 CFR 173.421 and 173.425, respectively, must be constructed so that it will not leak during normal transportation and handling conditions.

Bulk LLW shall be shipped in closed transport vehicles in accordance with Title 49 CFR 425(c). Containment of bulk waste shall be such that RWMS personnel can offload the waste without contaminating personnel or equipment.

- B. Nuclear Safety. The quantity of fissile materials within a package shall be limited so that an infinite array of such packages will remain subcritical. This quantity shall be determined on the basis of a specific nuclear safety analysis, considering credible accident situations, and taking into account the actual materials in the waste. (See Title 49 CFR 173.451, "Fissile Materials - General Requirements.")
- C. Nuclear Heating. The quantity of radioactive materials shall be limited for each waste matrix and package type so that the effects of nuclear decay heat will not adversely affect the physical or chemical stability of the contents or package integrity. Also see Title 49 CFR 173.442, "Thermal Limitations," for temperature limits of accessible external package surfaces.
- D. Radiation Levels. The external radiation levels for packages shall not exceed 200 millirem per hour on contact during handling, shipment, and disposal unless specifically excepted by DOT regulations. (See Title 49 CFR 173.441, "Radiation Level Limitations.") Type B containers that will be unloaded by remote procedures will be addressed on a case-by-case basis.
- E. External Contamination. Packages shall be within DOT contamination limits upon receipt at NTS. (See Title 49 CFR 173.443, "Contamination Control.")
- F. Activity Limits. The activity limits listed in Title 49 CFR 173.431, "Activity Limits for Type A and Type B Packages," shall be met. Where applicable, the activity limits of Title 49 CFR 173.421, "Limited Quantities of Radioactive Materials," and 173.425, "Transport Requirements for Low Specific Activity Radioactive Materials," shall be met for strong, tight packages.
- G. Multiple Hazards. Waste shall be packaged according to the level of hazard as defined in Title 49 CFR 173.2, "Classification of Material Having More than One Hazard." Incompatible MW shall be packaged in accordance with Title 40 CFR 264.177, "Special Requirements for Incompatible Wastes."
- H. Marking and Labeling. Waste shipped to the NTS from offsite must be marked and labeled as required in Title 49 CFR 172, Subparts D and E. Mixed waste packages of 110 gallons or less must also be marked in accordance with Title 40 CFR 262.32(b). Intrasite shipments shall be marked and labeled in accordance with the requirements of NVO-232. Marking and labeling of the waste packages shall be for chemically hazardous material, if present, in addition to the radioactive material. Limited quantity MW must be classified according to requirements for hazardous material as defined by Title 49 CFR 173.2.

Additionally each waste package shall be marked with a unique package identifier, or a combination of the shipment number and a package number, so that the package can be identified from another package within the shipment or from another set of packages.

2.1.2 NTS Specific Package Criteria

The use of properly designed packaging reduces the chance of radiological or occupational safety occurrences during transportation, handling, and disposal operations. In addition, preplanning the size and load of each package is essential to reducing the number of waste shipments to NTS and the space required for disposal. DOE/NV has adopted the following criteria to assure that the NTS waste management sites, specifically the Area 5 RWMS, are operated safely and efficiently. The criteria shall be incorporated in the design of all waste packaging, including strong, tight containers.

- A. Closure. The package closure shall be sturdy enough that it will not be breached under normal handling conditions and will not serve as a weak point for package failure.
- B. Strength. Except for waste packaged in steel drums, the waste package (packaging and contents) shall be capable of supporting a uniformly distributed load of 4,000 lbs/ft² (19500 kg/m²). This is required to support other waste packages and earth cover without crushing during stacking and covering operations.
- C. Handling. All waste packages shall be provided with permanently attached skids, cleats, offsets, rings, handles, or other auxiliary lifting devices to allow handling by means of forklifts, cranes, or similar handling equipment. Lifting rings and other auxiliary lifting devices on the package are permissible, provided they are recessed, offset, or hinged in a manner that does not inhibit stacking the packages. The lifting devices must be designed to a 5:1 safety factor based on the ultimate strength of the material. All rigging devices that are not permanently attached to the waste package must have a current load test based on 125 percent of the safe working load.
- D. Size. DOE/NV recommends that 4- x 4- x 7-ft (1.2- x 1.2- x 2.1-m) or 4- x 2- x 7-ft (1.2 x 0.6 x 2.1-m) (WHL) boxes or 55-gallon (210-liter) drums be used. While these sizes allow optimum stacking efficiency in disposal cells, other dimensions are acceptable with approval of DOE/NV.
- E. Weight. In addition to the weight limits set for specific packaging designs, NTS imposes limits of 9,000 pounds (4,082 kg) per box and 1,200 pounds (544 kg) per 55-gallon drum. Packages exceeding 9,000 pounds require crane removal and, if approved for shipment, must be shipped in removable-top trailers.

- ~~F. Loading. Waste packages shall be loaded to ensure that the interior volume is as efficiently and compactly loaded as practical. High-density loading will allow efficient RWMS space utilization and provide a more stable waste form that will reduce subsidence and enhance the long-term performance of the disposal site.~~
- G. Nonstandard Type A Packaging. If a waste generator uses DOT Type A packaging not evaluated under the DOE Type A Package Certification Program (see MLM-3245, DOT 7A Type A Certification Document), the generator shall have on file a safety analyses of the containment and packaging systems for review by DOE/NV.
- H. Package Protection. The generator shall take the following precautions to protect the waste package after closure. The requirements of Title 40 CFR 264, Subpart I, "Use and Management of Containers," shall be met for MW packages.
1. Each waste package shall be prepared for shipment so as to minimize damage during transit. (Minor damage incurred during transit, not attributable to poor packaging, will be repaired at the RWMS without charge to the waste generator. Costs for repairs of damage caused by waste generator or carrier negligence as well as any necessary decontamination may be charged to the waste generator.)
 2. The preshipment storage environment shall be controlled to avoid adverse influence from weather or other factors on the containment capability of the waste packaging during handling, storage, and transport. The generator preparing waste for preshipment storage shall take all reasonable precautions to preclude the accumulation of moisture on or in packages prior to their arrival at the NTS.
- I. Onsite Transfer. For onsite transfer of unpackaged or bulk materials, contamination on external surfaces shall be fixed, covered, or contained sufficiently for safe transfer and in accordance with NVO-232, Radiation Safety Manual for the Nevada Test Site, requirements.

2.2 Waste Form Criteria

Defense waste accepted at NTS must be radioactive and meet the following waste form criteria.

2.2.1 General Waste Form Criteria

These waste form criteria are based on current DOE LLW management practices and guidelines. DOE/NV recognizes that these requirements may need to be modified for certain waste streams. However, any modifications must be tailored to the specific waste stream and intended disposal environment, i.e., shallow land disposal (SLD) or greater confinement disposal (GCD), and must not compromise the performance objectives for the disposal site or violate any permit requirements.

- A. Transuranics. LLW must have a transuranic nuclide concentration not greater than 100 nCi/g.
- B. Hazardous Material. LLW offered for disposal at NTS waste management sites shall not exhibit any characteristics of, or be listed as, hazardous waste as identified in Title 40 CFR 261, "Identification and Listing of Hazardous Waste."
- C. Free Liquids. LLW disposed at NTS waste management sites must not contain free liquids. Waste containing liquids shall be solidified or have an absorbent, stabilizer, or both, added and mixed so that there will not be any free liquid during packaging, handling, transport, and disposal. Ion exchange resins must be dewatered and solidified to be considered as a solid waste. Liquid waste solidified by the urea-formaldehyde process will not be accepted. Minor liquid residue remaining in well-drained containers, or liquids which have been entrapped, are acceptable. In no cases shall free liquid content exceed 0.5 percent by volume.
- D. Particulates. Fine particulate wastes shall be immobilized so that the waste package contains no more than one weight percent of less-than-ten-micrometer-diameter particles, or 15 weight percent of less-than-200-micrometer-diameter particles, with radioactive contamination. When immobilization is impractical, the waste packaging shall include a sealed liner and be overpacked.
- E. Gases. Radioactive gases shall be stabilized or absorbed so that pressure in the waste package does not exceed 1.5 atmospheres at 20°C. Compressed gases as defined by Title 49 CFR 173.300, including unpunctured aerosol cans, will not be accepted for disposal.
- F. Stabilization. Where practical, waste shall be treated to reduce volume and provide a more physically and chemically stable waste form. If necessary the waste shall be treated to assure that significant quantities of harmful gases, vapors, or liquids are not generated. Wastes shall not significantly react with the packaging during normal storage, shipping, and handling time.
- G. Etiologic Agents. LLW containing pathogens, infectious wastes, or other etiologic agents as defined in Title 49 CFR 173.386 will not be accepted for disposal at NTS.
- H. Chelating Agents. LLW containing chelating or complexing agents at concentrations greater than one percent by weight will not be accepted.
- I. GCD Waste. LLW waste that meets the following waste form guidelines must be identified for placement in GCD at the Area 5 RWMS LLW Management Unit.
1. Wastes defined by DOE Order 5820.2A, Chapter III, as not being suitable for SLD. For example, LLW designated as greater-than-class C as defined in Title 10 CFR 61.55, "Waste Classification."

2. Volatile or mobile radionuclides when properly packaged to be acceptable for shipping, e.g., high-specific-activity tritium.
 3. Radioactive material that would exist in a concentration greater than 0.1 millicurie per gram when decayed for 100 years. For example:
 - a. cesium-137 at concentrations greater than 1 millicurie per gram.
 - b. strontium-90 at concentrations greater than 1 millicurie per gram.
 - c. cobalt-60 at concentrations greater than 50 curies per gram.
 - d. radium-226 at concentrations greater than 0.1 millicurie per gram.
 4. Other waste forms, on a case-by-case basis, that do not meet NTS requirements for SLD.
- J. Bulk LLW. Bulk LLW shall be solid and meet the requirements of Title 49 CFR 173.425(c)(1). Bulk waste is accepted for disposal only at the Area 3 RWMS Bulk Waste Management Unit.

2.2.2 Additional Criteria for Mixed Waste

Waste offered for SLD at the Area 5 RWMS MWMU must be hazardous as defined in Title 40 CFR 261, "Identification and Listing of Hazardous Waste," or state regulations, and be radioactive (intermixed with radioactive material). Mixed waste will not be accepted for GCD or for bulk disposal.

Except for the restriction against chemically hazardous materials, MW must meet all the waste form criteria listed in Section 2.2.1 for LLW. In addition, MW must meet the following criteria.

- A. Treated Waste. Mixed waste must receive any required treatment prior to shipping the waste to the Area 5 RWMS. Mixed waste can only be treated according to EPA-approved methods.
- B. Restricted Waste. Mixed waste prohibited from land disposal under Title 40 CFR 268, "Land Disposal Restrictions," will not be accepted unless treated as specified under Title 40 CFR 268, Subpart D, "Treatment Standards."
- C. Reactive Waste. Reactive or ignitable waste that has not been treated, rendered, or mixed in accordance with Title 40 CFR 264.312, "Special Requirements for Ignitable or Reactive Waste," will be reviewed for acceptance. Explosives, pyrophoric materials, or high-heat generators are not acceptable for MW disposal. Cyanide- and sulfide-bearing wastes in concentrations greater than ten percent by weight as CN⁻ or S⁻ will not be accepted. (If accepted for disposal, potentially incompatible waste must be identified by the most appropriate compatibility group listed in Title 40 CFR 264, Appendix V, "Examples of Potentially Incompatible Waste.")

5/10/11
D. Liquids: Mixed waste must not have free liquids as demonstrated by EPA Test Method 9095, "Paint Filter Liquids Test," specified in Title 40 CFR 264.314(c).

E. Polychlorinated Biphenyls (PCBs): PCB-contaminated waste will not be accepted for disposal at NTS unless the PCB concentration meets municipal solid waste disposal levels. See Title 40 CFR 761.60 for PCB disposal requirements.

SECTION 3

WASTE CHARACTERIZATION AND CERTIFICATION

The generator must obtain detailed waste characterization data and certify compliance with the WAC detailed in Section 2.

3.1 Waste Characterization

A waste characterization program needs to address the combined requirements of DOE Order 5820.2A for TRU waste and LLW, and Title 40 CFR 264 for MW. All TRU waste and LLW must be characterized to show that it contains no chemically hazardous constituents, i.e., they must be shown not to be MW. The generator is responsible for identifying each MW stream in accordance with Title 40 CFR 261. DOE/NV also will impose the requirements of Title 40 CFR 264.13, "General Waste Analysis," on the generator.

3.1.1 Waste Sampling and Analysis

TRU waste and LLW sampling and analysis shall be performed in accordance with recognized industry methods and standards. All MW shall be sampled in accordance with EPA requirements and methods, e.g., EPA-SW-846, Test Methods for Evaluating Solid Waste. A waste characterization program based on sampling and analysis should include the following elements in its waste analysis plan.

- A. Sample collection methodologies and documentation that sample collection methodologies are appropriate for the types of waste being sampled, will produce representative samples, and are approved methods. The number, location, and frequency of samples to be collected.
- B. Descriptions of sample containers and labels; sample preservation procedures; and sample handling and transportation procedures, including use of chain-of-custody forms.
- C. Laboratory analyses to be performed for each sample; analysis methods to be used; and descriptions of sample preparation (including compositing), calibration, and other laboratory quality control procedures. Identification of commercial laboratories providing analytical services, if appropriate. Documentation that the analytical methods for MW are EPA-approved methods.
- D. Interpretation of analytical data.

3.1.2 Characterization by Process Knowledge

The focus of the characterization activities is on balancing the requirements for definitive chemical and physical characterization of wastes streams containing both hazardous and radioactive constituents with the relative chemical hazard and the need to protect personnel from radiation exposure. There are circumstances where sampling and analysis are not feasible or necessary for characterization of hazardous constituents (see Title 40 CFR

262.11, "Hazardous Waste Determination"). Under these circumstances, techniques that rely primarily on knowledge of raw materials, processes, and materials balance can be employed to characterize the wastes. Such techniques may be employed when at least one of the following conditions are met.

- A. Waste stream is difficult to sample because of physical form. This primarily applies to pieces of metal (e.g., shielding) that contain hazardous constituents in their composition rather than as a residue that could be removed for testing or in a decontamination process.
- B. Sampling and analysis of waste stream could result in unacceptable risks of radiation exposure (i.e., violate the ALARA precept of the DOE).
- C. Waste is too variable to be characterized by one set of samples (e.g., drums containing contaminated protective clothing, rags, and absorbent).

For waste streams that cannot or will not be sampled and analyzed, the generator's waste analysis plan shall include the rationale for excluding waste streams from a sampling and analysis program and the method for collecting sufficient information to document compliance with the NTS WAC. Where sampling is not feasible, the generator shall prepare a detailed description, including concentration ranges of constituents of concern, of input streams to the processes that generate the waste, as well as a description of the waste generation process and any subsequent treatment and handling activities that affect the waste's chemical and physical characteristics.

3.1.3 Waste Stream Characterization Data

A copy of the characterization data for each waste stream is to be provided to DOE/NV as part of the generator's application to ship waste (Section 4.1). Periodically, DOE/NV (or contractor designees) may request the generator to split a representative sample of the waste stream for independent analysis to determine whether it is consistent with the waste analysis data provided by the generator. The data on the shipping manifests will be checked against the generator's waste analysis data. The generator will notify DOE/NV of any new waste streams, or change in the characteristics of old ones, and will provide a copy of the analysis of a representative sample (See Section 4.3.).

In addition to the detailed characterization data described above, a Waste Stream Characterization Data Sheet, shown as Figure 2, shall be submitted for each waste stream. This data sheet provides a characterization summary of the waste stream and identifies the waste stream with a unique identification number. This number will allow a history of waste streams to be maintained. When used in conjunction with the package identification number and the shipment number, NTS will be able to tie individual packages to valid waste streams. (Appendix B contains instructions for completing the Waste Stream Characterization Data Sheet.)

Waste Stream Characterization Data Sheet

1. Waste Stream No.: _____

2. Physical Characteristics:

a. Density: _____

b. Moisture Content: _____

c. Organic Material Content: _____

3. Radioactive Characteristics:

a. Is Waste > NRC Class C (see Title 10 CFR 61.55)?: _____

b. SWIMS Nuclide Category (circle): 1 2 3 4 5 6 7 8

c. Radioactive Constituents:

	<u>Nuclide</u>	<u>Low</u>	<u>Mean</u>	<u>High</u>	<u>Range</u> <u>(Units)</u>
(1)					
(2)					
(3)					
(4)					

4. Hazardous Characteristics (for mixed waste):

a. Basis for Identifying as Mixed Waste (circle): (1) Ignitable
(2) Reactive (3) Corrosive (4) EP Toxicity or TCLP (5) Listed Waste

b. Is this a Restricted Waste (see Title 40 CFR 268)?: _____

c. Hazardous Constituents:

	<u>EPA Hazardous</u> <u>Waste No.</u>	<u>Chemical</u> <u>Name</u>	<u>Concentration Range</u> <u>Low</u> <u>Mean</u> <u>High</u> <u>(Units)</u>
(1)			
(2)			
(3)			
(4)			

(Attach additional sheets if necessary.)

Figure 2. Example of Waste Stream Characterization Data Sheet

3.2 Waste Certification

DOE/NV requires that each waste generator certify that any waste to be sent to an NTS RWMS meets NVO-325 requirements. The elements of waste certification shall include a formal certification program and signed labels and statements certifying each waste package and shipment is in compliance with NVO-325.

3.2.1 Certification Program

Waste generators are required to develop a waste certification program to provide assurance that DOT, EPA, DOE, and NTS waste packaging, transport, and acceptance criteria are met. DOE/NV recognizes that each generator site has its own unique organization and program implementation methods. The waste certification program should fit within the generator's established site organizational structure.

The objective of the waste certification program is to ensure safe management of waste received at the NTS by:

- A. requiring generators to properly identify and characterize the wastes;
- B. providing a system for transmitting information about wastes to the NTS;
and
- C. providing an auditable system for verifying that the generators are properly characterizing their wastes.

Generator waste certification programs are subject to periodic technical audits and inspections by DOE/NV. These technical audits will verify implementation of the waste certification program and all other elements of waste operations considered necessary to waste certification. These technical audits are a part of the generator application and approval process that is described in Section 4 of this document.

The generator also shall prepare a plan for implementing the waste certification program. Generator waste certification program plan guidance is provided in Appendix C of this document. The guidance identifies items and activities that are critical to waste certification.

3.2.2 Certification Officials, Statements, and Labels

Each generator shall designate a Certification Official and one alternate who will be responsible for assuring that all waste packages and waste shipments comply with the requirements of this document. Generators that have 24-hour operations or produce large volumes of waste can request to have additional Certification Officials.

Requests for additional Certification Officials must include a detailed justification and be included in the generator's application to ship waste (see Section 4.1).

The Certification Official shall sign the generator's application certifying that the information is correct and that the waste stream(s) will meet the NTS WAC upon implementation of the certification program. In addition, the Certification Official shall sign an appropriate certification statement, to be included with the shipping papers for each waste shipment, indicating that the shipment meets DOT and EPA requirements (see Title 49 CFR 172.204, "Shipper's Certification," the generator's certification statement on the Uniform Hazardous Waste Manifest, and, for restricted waste, Title 40 CFR 268.7, "Waste Analysis"). The Certification Official's signature on this statement shall be deemed as certification that all NTS WAC are met.

To provide highly visible confirmation that waste is certified as meeting NTS WAC, DOE/NV requires that a signed "Packaging Certification" label (DOE/NV Form NV-211) (Figure 3), available from REEC Co DWMD, be affixed to each waste package offered for shipment. The NV-211 label contains the following certification statement: This certifies that this container and its contents are in acceptable condition for transportation and waste disposal according to DOT (49 CFR), EPA (40 CFR) and DOE/NV (NVO-325) requirements." Each NV-211 label shall be signed (legibly handwritten, not stamped) by a knowledgeable, responsible person who has been trained and qualified in accordance with the generator's waste certification program plan. This person certifies that the waste package meets NVO-325 requirements. The Certification Official shall be responsible for assuring that each package certifier is properly trained and qualified.

The generator shall provide DOE/NV and REEC Co DWMD written notification of the names of the Certification Official, alternate(s), and all qualified package certifiers. This list shall be reviewed and resubmitted annually or more frequently, if necessary.

PACKAGING CERTIFICATION

This certifies that this container and its contents are in acceptable condition for transportation and waste disposal according to DOT (49 CFR), EPA (40 CFR), and DOE/NV (NVO-325) requirements.

DATE: _____
CERTIFIED BY: _____
TITLE: _____
ORGANIZATION: _____

Figure 3. Example of NV-211 Form

SECTION 4

GENERATOR APPLICATION AND APPROVAL

All generators, from both on- and offsite, must receive the DOE/NV Manager's written approval for each waste stream prior to sending the waste to NTS waste management sites for storage or disposal. DOE/NV will consider requests from DOE field offices, DOE contractors, or other government agencies to ship DOE defense waste to the NTS, provided it meets the NTS WAC, characterization, and certification requirements. Requests for approval are made through a formal application and review process. DOE/NV will coordinate all applications and reviews and prepare responses.

Generators currently approved for shipping TRU waste and LLW shall submit a schedule for complying with the requirements of this document and a complete generator application as described in this section to DOE/NV and REEC Co DWMD within 90 days of issuance of this document.

4.1 Generator Application to Ship Waste

Any DOE defense waste generator desiring to send waste to NTS waste management sites must submit a complete application to both DOE/NV and REEC Co DWMD. The application consists of four main parts: generator information, waste certification program plan, waste stream information, and exemption requests. The application must follow the format outlined in Figure 4 and must be submitted as a complete package. Failure to follow these directions may lead to delays in processing the application.

The generator information section of the application includes information on the generating facility and personnel contacts in the DOE Field/Area Office and the generator's waste operations and certification organizations.

The generator must submit controlled versions of the waste certification program plan, identified in Section 3.2.1. Any supporting procedures essential to waste certification that are not included in the plan should also be submitted. Controlled revisions are required for the entire period of time a generator's approval to ship waste is to remain in effect. The plan shall include a detailed description, or references to procedures, indicating how each of the NTS WAC listed in Section 2 will be complied with.

The waste stream information section includes waste stream identification; justification for shipment to NTS; funding method; waste shipment forecast of waste volume, etc.; packaging and shipping information; special security or classification considerations; waste characterization plan and data; and a summary, signed by the Certification Official, certifying compliance with the NTS WAC. The certification summary shall address each criterion and state how each criterion is met by referencing specific procedures and testing or waste analysis results if applicable. Supporting information shall be organized so that it can be readily referenced to verify compliance with NTS WAC. For

APPLICATION TO SHIP WASTE

I. Generator Information

- A. Generator/Facility Name and Location
- B. EPA Identification Number (for mixed waste generators)
- C. DOE Field/Area Office and Contacts
- D. Contractor Name and Contacts

II. Waste Certification Program

- A. Waste Certification Program Plan (controlled copy)
- B. Certification-Related Procedures

III. Waste Stream Information

- A. Waste Stream Identification
 - 1. Waste Stream Number
 - 2. Waste Type (i.e., TRU, LLW, MW)
 - 3. Description of Waste (including generation process, treatment, final form, and special handling or disposal requirements)
- B. Justification for Shipment to NTS
- C. Funding Method
- D. Three-Year Waste Shipment Forecast
- E. Packaging and Shipping Information (including DOT proper shipping name, hazard class, hazard identification number)
- F. Security/Classification Information
- G. Waste Characterization Program
 - 1. Waste Analysis Plan (see Section 3.1 for contents)
 - 2. Procedures (including documentation that EPA-approved methods were used for mixed waste analysis)
 - 3. Waste Stream Characterization Data Sheet
 - 4. Waste Analysis Results
- H. Waste Acceptance Criteria Certification Summary
 - 1. General Regulatory Criteria for Packages (see Section 2.1.1)
 - 2. NTS Specific Package Criteria (see Section 2.1.2)
 - 3. General Waste Form Criteria (see Section 2.2.1)
 - 4. Additional Mixed Waste Form Criteria (see Section 2.2.2)

IV. Exemption Requests

- A. Area of Noncompliance and Reason for Request
- B. Requested Duration
- C. Plan for Corrective Action

Figure 4. Outline of Generator Application to Ship Waste

addressing multiple waste streams, the information shall be organized by waste stream in separate subsections.

An exemption request is required for any envisioned noncompliance to NVO-325 requirements. The exemption request, which must accompany the application to ship waste, shall include the type of exemption requested and the present circumstances that prevent compliance with the criterion for which an exemption is being sought; the projected duration of the exemption or reason why the waste cannot be brought into compliance; and a plan and schedule for corrective action to bring the waste into compliance with all criteria. Exemptions identified after an application has been submitted may be requested separately as an application addendum.

4.2 Generator Approval Process

A generator can make a written or verbal request to DOE/NV for waste storage or disposal. In response, DOE/NV will transmit the latest version of NVO-325 and generators will prepare a complete application as required. The application will be reviewed by a team composed of DOE/NV and contractor personnel, and additional information will be requested if necessary.

Upon completion of the review, the DOE/NV team will conduct a technical audit of the generator's waste certification program and issue an audit report. Should there be significant findings, corrective action will be required. The DOE/NV team will review any corrective action responses and approve or reject them. A re-audit of the generator will be performed if necessary. After completion of the waste certification program technical audit, the final audit report and generator's complete application will be considered by DOE/NV for approval. The DOE/NV Manager will provide written notice of approval or rejection of the application.

Unannounced technical audits, surveillances, and inspections may be performed at the discretion of DOE/NV. Additional waste sampling, analysis, and characterization may be requested to assure generator compliance with the WAC and waste certification program. In addition, DOE/NV may also require that the generator supply representative samples for independent analysis.

Figure 4 depicts the waste generator application, technical audit, and approval process which is designed to assure compliance with NVO-325.

4.3 Generator Recertification

Whenever a significant change occurs to the generating or treatment processes of a waste stream, the generator must notify DOE/NV and REECO DWMD. The waste must be recharacterized and certified. In addition, the generator is required to file a semiannual recertification report for all waste streams. The report shall provide the following information.

- A. Identification of waste by waste stream identification number.
- B. Update of the three-year forecast provided in the application.

WASTE GENERATOR APPROVAL PROCESS

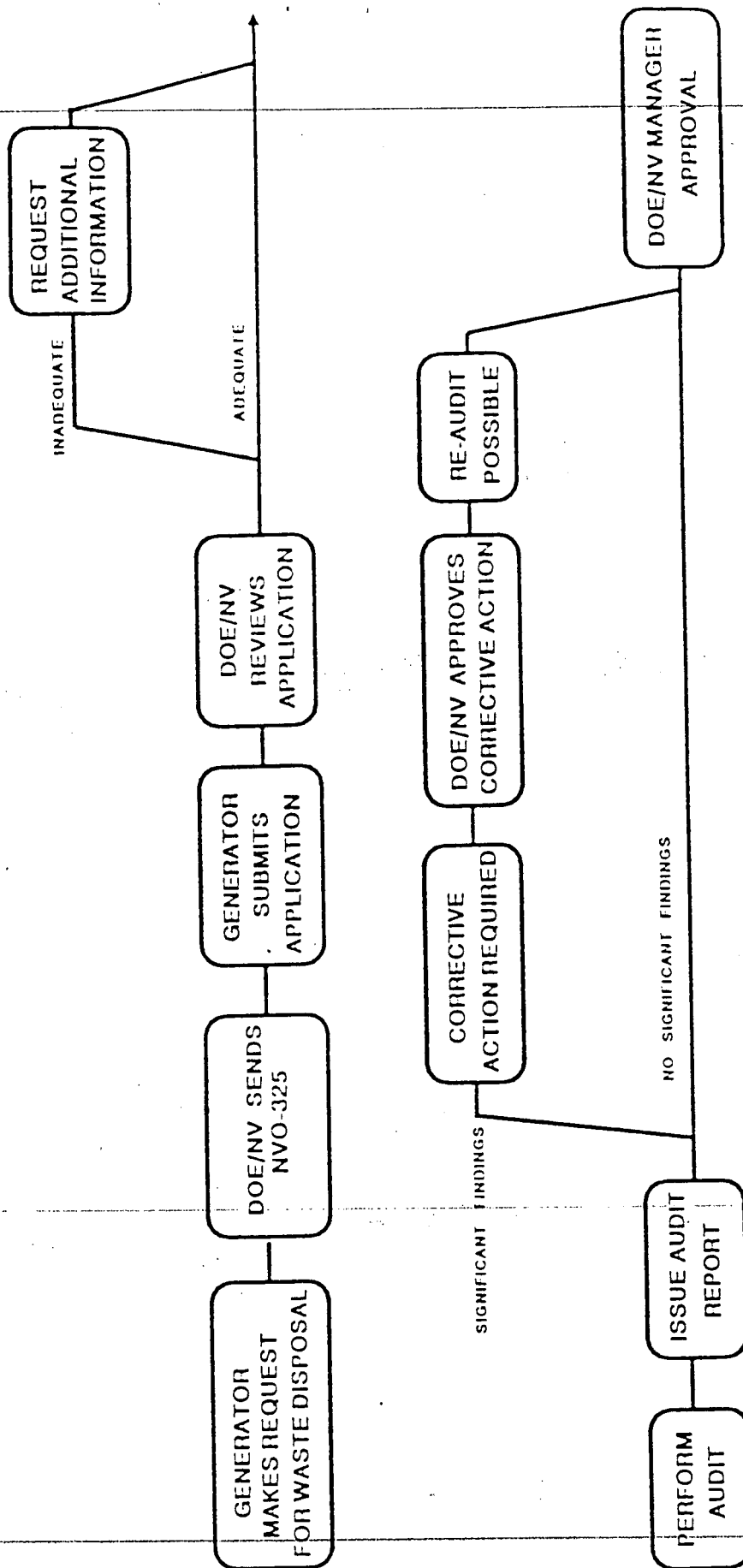


FIGURE 5. WASTE GENERATOR APPROVAL PROCESS

C. Assurance that the waste certification program plan is being followed and that the waste continues to meet NVO-325 requirements.

D. Results of additional waste characterization that is performed on a routine basis or because of a change in the waste process. If there have been no changes in the generating or treatment processes of the wastes, then the generator may provide a statement that the information in the original application is unchanged.

Where the initial application is accompanied by an exemption request, the recertification report must include an update of this request. If the schedule for corrective action has changed from that shown in the application or previous recertification report, then the reason for this change must be documented.

SECTION 5

WASTE TRANSFER

All waste shipments consigned to an NTS waste management site shall be made in accordance with applicable DOT, EPA, state, and local hazardous materials regulations and DOE/NV requirements contained herein. Also, all MW shipments shall be in accordance with Title 40 CFR 263, "Standards Applicable to Transporting of Hazardous Waste."

5.1 Shipping Arrangements

After a generator secures written approval from the DOE/NV Manager (see Section 4) to send defense waste to an NTS waste management site, the generator shall contact REEC Co DWMD to arrange for transfer of the waste and all accompanying records. REEC Co DWMD, Traffic, and Health Physics Departments will coordinate waste shipment transfers at NTS.

A. To expedite waste receipt and handling at NTS, offsite waste generators shall comply with the following procedure. (Past experience has proven this procedure to be an invaluable tool in preventing delays or problems for the generators, carriers, and NTS personnel.)

1. Before a waste shipment leaves its point of origin, the generator shall contact the REEC Co Traffic Section (Commercial: 702-295-6931 or 6307; FTS: 575-6931 or 6307) or for classified and special nuclear material shipments contact the DOE/NV Safeguards and NTS Security Branch (Commercial: 702-295-6780; FTS: 575-6780) and provide the following information:

- a. time of departure from shipping point and estimated arrival time at NTS;
- b. carrier and trailer numbers, and seal numbers where applicable;
- c. description of load (number of pieces, volume and weight);
- d. waste type (TRU, LLW, or MW); and
- e. any additional information deemed necessary (e.g., special handling requirements).

2. Address waste shipments to:

Defense Waste Management Department Manager
Reynolds Electrical & Engineering Co., Inc.
Nevada Test Site
Mercury, NV 89023

3. If shipments are delayed in transit for any reason, the generator shall contact REECo Traffic Section at the earliest opportunity and provide the new estimated time of arrival with pertinent information regarding the delay.
 4. The hours for receiving are 0800 to 1430, Monday through Friday, except holidays. If a shipment arrives too late to off-load, the REECo Duty Officer will instruct the driver to park the load at the front gate until it can be inspected by REECo Radioactive Materials Control and be approved to proceed to an NTS RWMS. The trailer(s) may be left at the holding area outside the front gate while driver(s) attend to personal needs. Housing is usually available onsite and may be prearranged through the REECo Traffic Section. The Duty Officer can make accommodations available upon arrival after hours.
- B. The waste generator also should contact REECo DWMD (Commercial: 702-295-6406; FTS: 575-6406) for determination of records requirements and to coordinate funding transfers. At a minimum the following records are required.
1. When accountable source and special nuclear materials from other than NTS sources are involved, a "Nuclear Material Transaction Report" (DOE/NRC Form 741) shall be completed and forwarded to the DOE/NV Safeguards and NTS Security Branch prior to shipment.
 2. Properly completed shipping papers as required by Title 49 CFR 172 Subpart C, "Shipping Papers," must accompany each shipment from offsite. Paperwork accompanying intrasite shipments must meet the requirements of NVO-232.

For MW, a "Uniform Hazardous Waste Manifest" (EPA Forms 8700-22 and 8700-22A), or equivalent state manifest, shall be used for both on- and offsite shipments. If the MW is regulated under Title 40 CFR 268, the manifest shall also be accompanied by the appropriate notice required by Title 40 CFR 268.7.
 3. The original and one copy of completed "Radioactive Waste Management - Storage and Disposal" forms (RE-0167/0166), or equivalent, shall accompany each shipment. The information required on these forms includes identities, quantities, and concentrations of radionuclides and hazardous species in waste material by package. Each package in a shipment must be identified by a package identification number and a waste stream identification number. The information can be submitted on these printed forms or on computer printouts. In addition, a subset of this printed information shall be electronically transferred to REECo DWMD. (REECo DWMD will provide the forms and a copy of RWM-4, Radioactive Waste Information System User's Manual, which explains how to prepare these forms, and provides instructions for electronic data transfers. More information on electronic data transfers can be obtained by contacting REECo DWMD data management personnel (Commercial: 702-295-5870; FTS: 575-5870).)

- ~~C. Onsite transfer of bulk LLW to the Area 3 RWMS shall be coordinated through REEC Co DWMD. REEC Co DWMD shall assure that adequate precautions are taken to minimize personnel exposure and to prevent the spread of contamination.~~

5.2 Waste Receipt

Upon arrival at NTS, shipments may be subject to off-loading delays at any time due to NTS operational schedules.

- A. At Mercury, the NTS base camp, each waste shipment from offsite will be inspected by REEC Co Radioactive Materials Control and Traffic personnel. Placarding will be inspected to assure it is in accordance with Title 49 CFR Subpart F.
- B. Upon receipt of waste at an NTS RWMS, REEC Co DWMD personnel:
1. Receive the shipping papers and waste generator's records, and obtain other pertinent data. Verify that a signed certification statement accompanied the shipment and that all required information is supplied and is correct. Verify that the shipment is properly placarded. Onsite generators should follow the requirements of NVO-232.
 2. Inspect the shipping vehicle and individual packages for integrity, external radiation levels, radioactive contamination and, for MW, hazardous material contamination.
 3. Verify that waste packages, including marking and labeling, meet all applicable requirements of NVO-325.
 4. Process compactible waste from onsite prior to disposal.
 5. Assign waste to appropriate area of the RWMS for storage or disposal.
 6. Record all actions taken regarding receipt and disposition of the received waste. Report any noncompliance to DOE/NV.
 7. Enter waste data into the NTS defense waste database and verify and file records.
 8. Return a copy of the "Uniform Hazardous Waste Manifest" for MW shipments to the generator.

5.3 Waste Records

Waste records include those required for shipping as well as those needed for the NTS defense waste database maintained by REEC Co DWMD. All hardcopy shipping records submitted must be legible (preferably typed) and clean to assure that they can be read by REEC Co personnel. Assurance of the accuracy of the waste data is necessary to guarantee the integrity and quality of the NTS defense waste database. At a minimum, the following records shall be included with each shipment.

- A. DOT-required shipping papers, including a "Uniform Hazardous Waste Manifest" for MW shipments.
- B. EPA-required notices for shipments of restricted MW (see Title 40 CFR 268.7).
- C. RE-0167/0166 forms or equivalent.

APPENDIX A

SELECTED GLOSSARY

1. Bulk Waste Management Unit: Portion of the Area 3 Radioactive Waste Management Site (RWMS) used for disposal of bulk low-level waste (LLW).
2. Contact-Handled: Waste packaged such that the dose rate at the package surface is not greater than 200 millirem per hour.
3. Contamination: Removable radioactive contamination on the package surface or shipping vehicle that exceeds the contamination levels listed in Title 49 CFR 173.443, "Contamination Control." (See Title 49 CFR 173.443 for swiping techniques.)
4. Disposal: The emplacement of LLW or mixed waste (MW) in a manner which is considered permanent in that routine recovery is not provided for.
5. Free Liquid: The presence of liquids in quantities exceeding 0.5 percent by volume or, for MW, as determined using EPA Test Method 9095, "Paint Filter Liquids Test."
6. Generator: An organization which produces transuranic (TRU) waste, LLW or MW as a byproduct or which certifies the waste.
7. Greater Confinement Disposal: Disposal of high-specific-activity LLW and other wastes unsuitable for shallow land disposal in augered shafts at depths greater than 70 feet (21 m).
8. Hazardous Waste: Waste identified or listed in Title 40 CFR 261, or that otherwise meets the Resource Conservation and Recovery Act (RCRA) definition of hazardous, or waste identified by applicable state regulations. For the purposes of this document, "hazardous waste" does not have any radioactive components.
9. Incompatible Waste: A MW that might react adversely with its containment materials or another waste as defined in Title 40 CFR 260.10.
10. Low-Level Waste: All radioactive waste not classified as high-level waste, spent nuclear fuel, TRU waste, uranium mill tailings, or MW. Low-level waste can contain TRU nuclides in concentrations not greater than 100 nanocuries per gram.
11. LLW Management Unit: Portion of the Area 5 RWMS used for the disposal of packaged LLW.
12. Mixed Waste: Waste containing both radioactive and hazardous components as defined by the Atomic Energy Act and the RCRA, respectively.
13. MW Management Unit: Portion of the Area 5 RWMS used for disposal of MW.

14. Package: The packaging together with its contents.
15. Packaging: The assembly of components necessary to ensure compliance with U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), and U.S. Department of Energy Nevada Operations Office (DOE/NV) requirements (see Title 49 CFR 173.403(u)). It does not include radioactive or hazardous components of the waste.
16. Radioactive Waste: Generic name used herein for TRU waste, LLW (including limited quantity, low-specific-activity, and high-specific-activity) and MW resulting from DOE defense program activities.
17. Radioactive Waste Management Site: Designated NTS site where radioactive waste handling, storage, or disposal operations are conducted under REECo Defense Waste Management Department control. The only approved NTS waste management sites are the Area 5 RWMS for storage of packaged TRU waste and disposal of LLW and MW and the Area 3 RWMS for bulk LLW disposal.
18. Shallow Land Disposal: Disposal of LLW and MW in landfills to depths of about 30 feet (9 m).
19. Solid Waste: Waste material that is an essentially dry, solid form. Waste may include well-drained containers or liquids which have been entrapped or otherwise solidified so that they will retain their solid form without the presence of free liquids during handling, transportation, storage, or disposal. Viscous waste material is determined to be a solid by testing in accordance with American Society for Testing Materials Standard D 4359, "Standard Test Method for Determining Whether a Material is a Liquid or a Solid."
20. TRU Waste: Radioactive waste containing alpha-emitting radionuclides having an atomic number greater than 92 and half-lives greater than 20 years in concentrations greater than 100 nCi/g.
21. Treatment: Operations that benefit safety or economy by changing the waste characteristics. Five basic treatments are (a) volume reduction, (b) immobilization of radioactive/hazardous species, (c) change of composition, (d) removal of radioactive or hazardous species from the waste, and (e) solidification of liquids.

APPENDIX B

INSTRUCTIONS FOR THE WASTE STREAM CHARACTERIZATION DATA SHEET

1. Waste Stream Number: List two-part, thirteen-character alpha-numeric code which identifies generator and generator's waste stream code.

Generator: Four-character alpha-numeric code used by the DOE Solid Waste Information Management System (SWIMS).

Waste Stream: Nine-character, generator-assigned alpha-numeric code for a specific waste stream.

Example: For a Rocky Flats waste stream, the waste stream number would be written as:

ARIR-0000XXXXX

where ARIR is the SWIMS designation for Rocky Flats and 0000XXXXX is the Rocky Flats-assigned waste stream code.

2. Physical Characteristics: Provide the density, moisture and organic material content of the waste.
3. Radioactive Characteristics:
 - a. Indicate whether waste would be classified as being greater than Class C as defined in Title 10 CFR 61.55, "Waste Classification."
 - b. Nuclide Category: Identify SWIMS nuclide category number as follows: 1-TRU, 2-Uranium/Thorium, 3-Fission Product, 4-Induced Activity, 5-Tritium, 6-Beta-Gamma-TRU, 7-Alpha, 8-Other.
 - c. Radioactive Constituents: List all nuclides which are a part of the waste. The activity levels are to be reported at the lowest level expected, as a mean, and at the highest level expected.
4. Hazardous Characteristics:
 - a. Basis for Listing as Hazardous Waste: Identify decision-making process using criteria listed in Title 40 CFR 261, "Identification and Listing of Hazardous Waste."
 - b. Indicate whether waste contains hazardous constituents restricted from land disposal under Title 40 CFR 268, Subpart C, "Prohibitions on Land Disposal."

- c. Hazardous Constituents: List all constituents which are part of the waste and which are considered hazardous under Title 40 CFR 261. The constituents will be identified by their EPA waste code numbers. Above descriptions for activity declarations are applicable to concentration declarations.

APPENDIX C

GENERATOR WASTE CERTIFICATION PROGRAM PLAN GUIDANCE

PURPOSE

This guidance is provided to waste generators to assist in preparing waste certification plans. The guidance format is equivalent to the 18 elements of NUREG-1293, Quality Assurance Guidance for Low-Level Radioactive Waste Disposal Facility, but includes the essential elements from EPA-SW-846, Test Methods for Evaluating Solid Waste. The U.S. Department of Energy/Nevada Operations Office (DOE/NV) recognizes that each generator site has its own unique organization, management techniques, and quality assurance (QA) programs, and the waste certification program should fit within the established site organizational structure. The waste certification program plan must include enough specific information to describe the planned activities for compliance with the waste characterization and waste analysis requirements of NVO-325, Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements.

This guidance focuses on the substance and content of the waste certification program plan by identifying topics to be discussed in each of the 18 specific elements. These items and activities require preplanning and are critical to the waste certification effort. The certification plans will be reviewed and commented on by DOE/NV and REECO DWMD, and accepted or rejected by DOE/NV based on these elements. The specific elements will also provide major subject areas for technical audit checklist development.

SPECIFIC ELEMENTS FOR WASTE CERTIFICATION PROGRAM PLANS

1. ORGANIZATION

This section briefly describes the general management structure of the generator organization, the major tasks performed by the organization and, in more detail, identifies specific organizations in which transuranic (TRU) waste, low-level waste (LLW), and mixed waste (MW) are generated, processed, certified, and shipped.

A simplified organizational chart should be included, depicting the general management structure of the organization. Organizations which generate, characterize, certify, package, or ship wastes should be clearly identified. The chart should also include oversight and special service (e.g., QA, ES&H, analytical laboratories) organizations which play a part in waste certification at the generator site. A second, functional chart or diagram which depicts the flow of the waste generation and certification process, and the quality control interfaces, is useful and recommended. The Certification Official's relationships to others in the waste process should be identified. Descriptive paragraphs discussing the organization should be provided. The organization section should emphasize the generator's commitment to producing

waste which meets the requirements of NVO-325. A commitment to a training program for all activities and location of the training program within the organization should also be included.

2. QA PROGRAM

This section should describe an independent group committed to defining QA policy and providing independent oversight for activities which produce, package, characterize, certify, store, and ship defense waste. The oversight function is to review the operations as well as the controls imposed on them, all of which, when combined, lead to certification. A general statement on QA policy and independence should appear in this section of the certification plan. A functional chart depicting the organization for waste certification should be presented. A general statement of training, retraining, and qualifications of the QA staff for certification should be included.

3. DESIGN CONTROL

Certain facilities or processes to be designed and constructed to satisfy waste certification criteria, or confirm that certain wastes meet waste certification requirements, must have specific design controls imposed. For example, waste solidification is a process which requires specific controls to verify design parameters related to volume, proper mixture, hydration, sizing of equipment for proper throughput, and product specification. Design of process or laboratory facilities requires consideration of safety standards for nuclear facilities, or a permit for MW treatment and storage. Design of facilities related to MW certification must reflect the standards for treatment appearing in Title 40 CFR 268. Design of facilities for MW analysis must consider requirements for sampling analysis and data control required by EPA-SW-846.

The design of waste certification related equipment, processes, or systems should be reviewed by persons other than the primary designers. Reviewers are to be technically competent to perform meaningful review and must have organizational independence. Written comments on design issues provided by reviewers should be provided to task managers, studied, and resolved. The entire design and design review task should be subject to independent review by a QA organization.

4. PROCUREMENT DOCUMENT CONTROL

Certain items and services critical to the certification program should be procured under a controlled and documented system. Accepted documents should be used to prepare purchase requisitions and purchase orders. Provisions to review purchase requests from both cost and quality viewpoints should be included in the purchasing documents. The documents should include provisions for materials inspection, vendor/fabrication inspections, and receipt inspections, when deemed necessary.

Examples of items or services to be procured according to controlled procurement document procedures are Type A containers, analytical services for identifying and quantifying hazardous waste constituents of MW, and specific assay systems for radionuclides.

5. INSTRUCTIONS, PROCEDURES, DRAWINGS

Activities critical to certification require controlled system management. Certification activities are to be planned, and controlled by accepted implementing procedures. Certain processes or facilities require design drawings, which should be reviewed, kept current, and retained. Examples of important certification activities requiring procedures, instructions or drawings are: waste characterization, waste analysis, (includes both radionuclide and chemical constituents in MW), and compliance with EPA test protocols for characteristic and listed wastes. EPA protocols for MW sampling, sample identification, packaging, chain-of-custody, and data control should be used and carefully controlled.

Up-to-date drawings for facilities and processes related to certification should be prepared, reviewed independently, maintained and kept current. Specific instructions and procedures for those who perform the QA/QC tasks related to certification, including instructions for audits, reports, and resolution of nonconformances should also be prepared.

The system whereby instructions, procedures, and drawings are authorized, reviewed, accepted, distributed, used, and kept current should be reviewed by persons independent of the waste operations program. Those independent persons who inspect or observe certification activities, should determine by interview of workers that the instructions, procedures, and drawings are properly distributed, understood, and used by those conducting certification activities.

6. DOCUMENT CONTROL

The waste generator should have in place a system which controls authorization, preparation, review, acceptance, distribution, recall, and update of documents important to certification. NVO-325 should be handled as a controlled document because it is a major source of guidance for waste certification program requirements.

The plan should identify those organizations or persons responsible for the control of documents. The plan should be kept current, and DOE/NV should be notified of changes to the controlled documents.

7. CONTROL OF PURCHASED ITEMS AND SERVICES

Purchase of materials, items, or systems important to certification activities should be controlled by carefully prepared requisitions and purchase orders. Compliance with the written specifications must be verified upon receipt. Where necessary, vendor audits should be performed to observe manufacture or

assembly of the purchased products. Examples of items or services important to the certification process are containers--(DOT Type A), analytical or assay services, and process equipment for production of acceptable waste forms.

Purchasing departments often perform vendor inspections. A specialist familiar with EPA sampling, chain-of-custody, analytical, and data control requirements should review, verify, and document these specific tasks for MW streams. Persons or organizations performing these tasks shall be identified in the plan.

8. IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

Certain materials important to the certification processes should be carefully identified. Examples are waste packages with conforming waste materials, radiation detection instruments used for certification-related surveys, calibration sources for radiation detection instruments, acceptable waste containers and liners, cement or accepted solidifiers, and X-ray tubes.

Materials used for certification process purposes, purchased services such as sample collection and packaging for assay or analysis, components of measuring devices, or packages that require compliance with waste certification requirements should be properly identified, reviewed or inspected. Samples and data packages should be properly identified and carefully controlled. Materials, parts, samples, and components found to be out of specification, or not operable, should be handled as nonconforming items.

9. CONTROL OF PROCESSES

Certain processes, or series of activities important to waste certification, must have controls or verification steps identified as part of operating procedures. These processes and critical inspection points must be clearly identified and described in the waste certification program plan.

For MW, critical EPA requirements related to sample collection, packaging, analysis, verification and data handling must be described in detail sufficient to qualify as acceptable waste characterization/waste analysis plans for offsite disposal. Similar activities related to radiological assays should be controlled and carefully described. The entire waste certification process, which provides evidence of compliance with NVO-325, is a controlled process, with records, statements, labels, reports, and data being used by the Certification Official to sign a certification statement. The process of procuring, inspecting, storing, filling, closing, labeling, manifesting and shipping waste containers is also a controlled process.

Activities identified above should be performed under procedures prepared by the operating group, and reviewed by audits, inspections, or surveillances performed by persons not included in task performance, to provide oversight independence.

10. INSPECTION

Inspection and surveillance of activities are performed by the certification organizations for waste certification. The waste operations organization performs inspection for process control or verifying waste characterization activities. Inspections also can refer to program reviews performed by an independent entity within the waste generator organization. Inspections should include review of current implementing procedures, and evaluation for procedural compliance.

Inspection and surveillance activities should be scheduled, and performed on selected certification activities at a frequency to be determined by certification program management. Independent inspections by persons not part of the certification program should also be scheduled. Reports of inspection activities should be prepared, reviewed, supplemented when necessary, and distributed for resolution. Inspection reports should be centrally stored or archived to facilitate their review during DOE/NV technical audits.

11. TEST CONTROLS

Certain physical tests are necessary to substantiate waste certification, to resolve uncertainties, or verify quality. Proposed tests should be evaluated to ensure that the tests are designed to provide correct data. Examples of test controls are instrument calibration, spiked or split samples, replicate samples, blanks, background measurements, electronic calibrations, and calibration source traceability.

Test plans or protocols should be prepared by those who will perform tests, and reviewed by a second disinterested but technically competent individual. Independent individuals who inspect or audit the certification program should review the process by which tests are planned, controlled, and technically reviewed.

12. CONTROL OF MEASURING AND TEST EQUIPMENT

Test equipment and measuring devices should bear, by label, notation or some other means, evidence that they are currently calibrated or certified for current use. A sample sticker attached to a radiation survey meter indicating the last calibration date and the next due date is sufficient evidence that the survey meter is operable and calibrated, provided that the instrument calibration program is judged to be adequate. Environmental controls and measurements which determine temperature, humidity and dust concentrations in which certain test equipment should operate are other examples of controls for measuring and test equipment. Property tags also may serve as controls.

Users of test and measurement equipment should provide evidence of operational readiness for equipment under their purview. Review of the program should be by an independent entity.

13. HANDLING STORAGE AND SHIPPING

Wastes should be handled, stored, and shipped in a manner which will not alter the certification status. Handling and storage considerations should include provisions for security and fire protection. MW should comply with EPA requirements for storage (Title 40 CFR 264 Subpart I). Handling and storage of radioactive waste should comply with As Low As Reasonably Achievable (ALARA) precepts. Waste shipments are to comply with DOT (Title 49 CFR Parts 171-177), EPA (Title 40 CFR Parts 262 and 263) and NVO-325 requirements with respect to packaging, manifests, and labeling.

14. INSPECTION, TEST, AND OPERATIONAL STATUS

This item refers to the status of the waste certification program or certain processes or activities within the program. To certify waste, a waste certification program plan must be submitted to and accepted by DOE/NV. The certification plan is to be implemented by specific procedures, as demonstrated by internal inspection, independent inspection and DOE/NV technical audit. Waste certification authority will be granted if there are no significant findings at the conclusion of the technical audit. Findings of significant nature (items which could result in uncertifiable waste being certified) by any program review can result in loss of certification authority, or a recall of waste which had been "certified."

Initial certification authority is granted by the Manager of DOE/NV, by letter to the DOE organization at the generator site. Certification authority can be continued or revoked as a result of subsequent technical audits. Self inspections or inspections by independent entities within the waste generator organization could also result in a temporary loss of certification authority. More likely, significant findings by generator inspection might determine that uncertified waste has been shipped as certified. The waste generator, upon discovering the problem, must contact DOE/NV and REECO DWMD, and together, satisfactory resolution of the situation must be negotiated.

15. CONTROL OF NONCONFORMING ITEMS

Nonconforming items can be out-of-specification empty waste containers, nonconforming wastes, nonconforming test and measurement devices, or any out-of-specification or noncompliance item which could adversely affect waste certification. Such nonconformance must result in removal of the nonconforming item from operating status, or operational acceptance. Nonconforming objects, equipment, items, containers, or waste should be clearly identified by label, tag, segregation, or other mechanism to ensure removal from the certification process. Written documentation of nonconforming items and their resolutions is required.

Nonconformances can and should be identified by anyone associated with waste certification activities.

16. CORRECTIVE ACTIONS

Once identified, nonconforming items must be documented and tracked until successful resolution can be demonstrated. The corrective action should be performed to correct nonconformances resulting from:

- a. inspections, surveillances, or audits;
- b. failure of current processes to provide certified waste forms;
- c. certification of waste based on assay system data or analytical processes found to be out of calibration or inoperable;
- d. failure to properly perform activities critical to certification because of lack of or inadequate procedures;
- e. improper packaging;
- f. inadequate or erroneous manifests or data packages;
- g. lack of waste certification statement on data packages, which relate to specific containers; or
- i. inadequate waste analysis and/or failure to analyze a representative sample.

Identification and correction of nonconforming items is a key element of waste certification, which will be reviewed during all technical audits and quality program audits, either by onsite or offsite auditors.

Adequate corrective action for nonconforming items is the responsibility of each individual associated with waste certification activities including certifying officials, waste generators and operators, shipping management, support services management, and QA management.

17. QA RECORDS

17.1 Requirements

Records demonstrating compliance with certification criteria should be maintained for time periods equivalent to similar onsite records retention requirements. QA records important to certification include, but are not limited to: the waste certification program plan, organization charts, training records, letters/memos providing notification of planned technical or quality audits, inspections, audit report checklists, responses, and nonconformance findings with completed corrective actions. QA records related to waste certification should be stored in a single location properly secured and protected from fire.

18. AUDITS/SURVEILLANCES

Technical audits/surveillances are conducted to assess performance of the waste certification program with certification requirements of NVO-325. These audits are not quality program audits (i.e., audits of generator QA programs and plans). Technical audits and surveillances are performed to assess the adequacy of the waste certification program with respect to waste process controls, radiological assay, chemical analysis compliance, waste form compliance, records compliance, and container and shipping compliance. These technical audits are formal events, fully planned and documented, with written notifications, checklists, reports, and resolution all being part of the audit method.

Technical audit/surveillance activities at generator sites include self audits by certification program participants, independent inspections and surveillances by persons at the generator site not associated with waste certification, site contractor management, onsite DOE management, DOE/NV, or DOE Headquarters program management.

19. TRAINING

All persons associated with the defense waste certification program at generator sites must be trained in the requirements of their waste certification program plan and NVO-325. All persons who generate, package, certify, prepare data, perform related radiation surveys, or perform the associated quality functions, must have received training in the requirements and implementing procedures for those parts of the certification program in which they are involved. EPA regulations related to MW activities must also be included in the training program to ensure that waste analysis and characterization, sampling, and control of data are performed as required.

Personnel training courses in waste certification are prepared according to instructions provided and/or accepted by those responsible for the certification program. Personnel retraining is conducted on a specified frequency.

Records of training course content, exams, if any, and test results are to be maintained. A master list of trained individuals should be maintained and available for review by audit personnel. The organization responsible for the training program maintains training materials and records.